

WINTER/SPRING 1983

NUMBER 7

Los Alamos Science

LOS ALAMOS NATIONAL LABORATORY



" . . . When you come right down to it the reason that we did this job is because it was an organic necessity. If you are a scientist you cannot stop such a thing You believe that it is good to find out how the world works . . . [and] to turn over to mankind at large the greatest possible power to control the world and to deal with it according to its lights and its values.

" . . . I think it is true to say that atomic weapons are a peril which affect everyone in the world, and in that sense a completely common problem I think that in order to handle this common problem there must be a complete sense of community responsibility.

" . . . The one point I want to hammer home is what an enormous change in spirit is involved. There are things which we hold very dear, and I think rightly hold very dear; I would say that the word democracy perhaps stood for some of them as well as any other word. There are many parts of the world in which there is no democracy And when I speak of a new spirit in international affairs I mean that even to these deepest of things which we cherish, and for which Americans have been willing to die—and certainly most of us would be willing to die—even in these deepest things, we realize that there is something more profound than that; namely the common bond with other men everywhere“

J. Robert Oppenheimer
speech to the Association of Los Alamos Scientists
Los Alamos
November 2, 1945

Los Alamos Science

WINTER/SPRING 1983 VOLUME 4, NUMBER 7

CONTENTS

THE EVOLUTION OF THE LABORATORY

The Oppenheimer Years 1943-1945 6

A portrait of Project Y through primary sources
compiled from the Los Alamos Archives and Report Library by Judith M. Lathrop

The Bradbury Years 1945-1970 26

Press Statement to *The New Mexican*, September 1954 26
by Norris Bradbury

Bradbury's Colleagues Remember His Era 29
An interview with Carson Mark, Dick Baker, George Cowan, Louis Rosen,
Bill Oakes, and Gene Eyster

A Comment from Bradbury in 1980 53

LAMPF: A Dream and a Gamble 54
by Louis Rosen as told to Nancy Shera

Magnetic Fusion 64
by James A. Phillips

The Agnew Years 1970-1979 68

Vintage Agnew 69
Excerpts from speeches by Harold Agnew between 1966 and 1977

The Times They Were a Changin' 73
An Interview with Raemer Schreiber and Bob Thorn

Major Efforts during the Agnew Years

The Laser Programs 80
by Keith Boyer

The Reactor Safety Program 82
by Kaye D. Lathrop

The Nuclear Safeguards Program 84
compiled by Darryl B. Smith

The Hot Dry Rock Program 86
by Morton C. Smith

CONTENTS

The Kerr Years 1979 —	88
Challenges and Prospects	89
by Donald M. Kerr	
What's Happening Now . . .	94
A Round Table with Dan Baker, Stirling Colgate, Brian Crawford, Rocky Kolb, Sig Hecker, Mac Hyman, Steven Howe, Jeremy Landt, Steve Rockwood, and John Wheatley	
Some Short Monologues	
Dan Baker on Space Sciences	96
Sig Hecker on Materials Science	98
Jeremy Landt on Electronics	100
Brian Crawford on Life Science	101
Laboratory Support for Basic Research -A note from the management	103
Rocky Kolb on Cosmology	104
The Participants	107

THE WEAPONS PROGRAM

Overview	111
by C. Paul Robinson	
Nuclear Data—The Numbers Needed to Design the Bombs	114
by Ben C. Diven, John H. Manley, and Richard F. Taschek	
Early Reactors—From Fermi's Water Boiler to Novel Power Prototypes	124
by Merle E. Bunker	
Computing and Computers—Weapons Simulation Leads to the Computer Era	132
by Francis H. Harlow and N. Metropolis	
Plutonium—A Wartime Nightmare but a Metallurgist's Dream	142
by Richard D. Baker, Siegfried S. Hecker, and Delbert R. Harbur	
Criticality—The Fine Line of Control	152
by Hugh C. Paxton	
Weapon Design—We've Done a Lot but We Can't Say Much	159
by Carson Mark, Raymond E. Hunter, and Jacob J. Wechsler	

Field Testing—The Physical Proof of Design Principles by Bob Campbell, Ben Diven, John McDonald, Bill Ogle, and Tom Scolman	164
Authors	180

OTHER PERSPECTIVES

The British Mission by Dennis C. Fakley	186
Seven Hours of Reminiscences by Edward Teller	190

Los Alamos Science wishes to thank the following people for their contributions to this historical issue: Ira Agins, John Allred, Dan Baca, Tom Bauman, Richard Boudrie, James Bradbury, Karl Braithwaite, Dan Butler, Joanne Claybrook, Donald Cochran, Jim Coon, Harry Dreicer, Raymond Elliot, Jo Anne Espinosa, Kenneth Freese, Donald Grisham, Stanley Hall, Eugenie Higgins, Patrick Hodson, Alison Kerr, Robert Krohn, Phil Lang, Dolores Lazzaro, Allan MacKinnon, Donila

Martinez, Elizabeth Martinez, Harold Martinez, Suzie Martinez, Pat Metropolis, Hank Motz, Barbara Mulkin, Eulalia Newton, Nancy O'Hair, Richard Ray, Tony Rivera, Richard Robinson, Bill Jack Rodgers, Clara Salazar, Diane Sandoval, Eugene Sandoval, Arthur Saponara, Kathryn Skipp, Marilyn Sweet, Susie Trambley, Mitzie Ulibarri, Carroll Sue Wagner, Jack Weber, Jack Worlton, Ivan Worthington, Phillip Young.

On the cover.

A celebration of the Laboratory's forty years in two- and three-dimensional computer graphics by Rongriego. The liquid-crystal-display font for the numeral 40 was constructed with a three-dimensional data base of polyhedrons. The two-dimensional multicolored patch pattern was generated with a simple

scan-line algorithm, a random-number generator, and a linear/nonlinear color model. The program was written in ESP-FORTRAN and run on a VAX 11/780; the 35-mm output was generated on an FR80 color COM recorder.

Address mail to
 LOS ALAMOS SCIENCE
 LOS ALAMOS NATIONAL LABORATORY
 MAIL STOP M708
 LOS ALAMOS, NEW MEXICO, 87545

Los Alamos Science is published by Los Alamos National Laboratory, an Equal Opportunity Employer operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

The Evolution of the Laboratory



